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ANALYSIS OF THE BENEFITS AND RISKS OF INTEGRATING ARTIFICIAL INTELLIGENCE TECHNOLOGIES IN THE FINANCIAL SECTOR: A DUAL PERSPECTIVE

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Abstract
Over time, Artificial Intelligence (AI) has evolved from abstract theories into practical solutions, fundamentally transforming how data is managed and used in financial institutions, as well as the services offered to their customers. In this paper, I will highlight the impact of AI-based technologies, focusing on evaluating the necessity of their use in financial institutions and analyzing customers' preferences for new products and services. As such, I have conducted a detailed analysis of the benefits and risks associated with AI technologies in the financial sector, considering the perspectives of both financial institutions and their customers. As future research directions, we plan to examine the influence of the widespread implementation of AI technologies on job availability.
Keywords: artificial intelligence, economics, finance, digitalization, client
JEL Classification: O33, M10, L20

1. INTRODUCTION

In the current context, the role of digitalization and Artificial Intelligence (AI) technologies has significantly expanded across various financial sectors of the economy. Emerging AI technologies bring a range of benefits and risks that impact both financial institutions and their clients. This dual impact underscores the need to approach this topic from a two-dimensional perspective, evaluating the influence of intelligent technologies on the functioning of financial markets and the services provided by financial institutions.

The choice of this research topic is driven by the ongoing debate surrounding the advantages and risks of AI implementation in the financial sector. Such investigations can contribute to informed decision-making and the development of appropriate policies in this continuously evolving field.

The research questions guiding this study, which aims to explore the specifics of AI technologies, will be examined from a dual perspective: that of ***financial institutions*** and their ***clients***. From the perspective of financial institutions, the following questions will be addressed:

• What long-term advantages can be achieved by implementing AI technologies in financial institutions, particularly in terms of profit, efficiency, and market positioning?

• How can the risks associated with AI be mitigated to enhance firms' operational performance?

From the clients' perspective, we will address the following questions:

• To what extent do clients trust AI-powered products and services?

• How do clients perceive the integration of new AI technologies within financial institutions?

The objective of this scientific communication is to thoroughly analyze the necessity of using AI technologies in financial institutions and to evaluate clients' preferences regarding new products and services, providing answers to the questions mentioned above. The main objectives will be addressed methodically. In the first chapter, I will review the existing literature. In Chapter 2, I will describe the methodology used in the research. Chapter 3 will present the data and results of the study from a quantitative analysis perspective. In Chapter 4, I will assess the benefits and risks associated with AI implementation. In the final chapter, I will use statistical data to discuss the level of technology adoption in the EU and Romania, analyzing the specific applications of AI in finance. The conclusion chapter will include key insights, future research directions, limitations encountered during the analysis, and practical strategies for effectively integrating AI into the country's economic activities.

2. ARTIFICIAL INTELLIGENCE: A BRIEF ANALYSIS OF THE SPECIALIZED LITERATURE

AI can be defined through multiple interpretations, depending on two key dimensions: the thinking dimension and the behavioral dimension. Each of these dimensions, in turn, evaluates success in terms of either human performance or reasoning, representing an ideal concept of intelligence.[1] According to the first interpretation, AI is defined as "the automation of activities we associate with human thinking, activities such as decision-making, problem-solving, learning…" (Bellman, 1978, p. 3). Another definition of AI presents it as "the study of mental capabilities through computer models" (Charniak and McDermott, 1985, p. 6). In the second interpretation, AI is "the art of creating machines that perform functions requiring intelligence when performed by humans" (Kurzweil, 1990, p. 14). Under this interpretation, from a rationalist perspective, AI is "a field of study that seeks to explain intelligent behavior in terms of computational processes" (Schalkoff, 1990, p. 8).

[1] Leon, F., Artificial Intelligence – Principles, Techniques, Applications, Tehnopress Publishing, Iași, 2006, p. 24

As a science, Artificial Intelligence has drawn on many ideas and techniques from other disciplines. In over 2,000 years of philosophical tradition, theories of reasoning and learning have emerged alongside the idea that the mind operates as a physical system. From mathematics, we have formal theories of logic, probability, and decision-making. From psychology, we have tools to investigate the human mind and language to articulate the resulting theories… And from computer science, we have the necessary tools to make AI a reality.[2]

In the specialized literature, debates have emerged regarding the role and positioning of AI technologies in finance. Baxter Hines argues that digitalization will transform the traditional financial market into one that is more modern, fair, and transparent.[3] The financial environment is volatile, and the ability to anticipate and adapt swiftly to market fluctuations is crucial. In addressing these important aspects, AI has become a timely topic in financial activities. According to Zhiyi Liu, intelligent technology enables financial institutions to develop new products and services that meet customer demands and improve overall performance.[4] However, there are also dissenting opinions. Some authors[5] approach this concept with skepticism, arguing that an algorithm lacks the ability to emotionally interact with a human subject. According to them, it is not enough to have an extensive database to truly understand risk inclinations, convey trust to clients, or find stable configurations that predict the future. We live in an uncertain, unstable, and unpredictable world, and finance is one of the typical examples of this uncertainty, as algorithmic forecasting failures demonstrate.

Following the analysis of these sources, I observed a gap regarding the scientific studies on the impact of AI technologies in finance, which would address both the interests of financial institutions and those of their clients. A dual perspective is necessary to form a more relevant and current overview, which can guide the search for effective solutions and beneficial action directions for all participants in economic activities within financial institutions. Therefore, I have decided to gather data that will create a foundation for more comprehensive studies and research in this field. In this exploratory paper, I aim to confirm the hypothesis that AI increasingly dictates the performance of economic entities and provides a wider range of services, ensuring a more enjoyable experience for clients.

[2] Ibidem, p. 24.
[3] Hines, B., Digital Finance. Security Tokens and Unlocking the Real Potential of Blockchain, Wiley, 2020, p. 1
[4] Liu, Z., Digital Finance. How Innovation Reshapes the Capital Markets, Springer Nature Singapore, 2023, p.14
[5] Viale, R., et al, Artificial Intelligence and Financial Behaviour, Edward Elgar Publishing, 2023, p.1-5

3. METHODOLOGY

In conducting this research, I employed both quantitative and qualitative methods. This dual approach was necessary to address the study's multidimensional requirements.

To determine the importance and relevance of implementing AI technologies in financial institutions, I employed qualitative methods, including the analysis of annual reports, the collection of significant data from specialized literature, official articles, and statistical sources. Furthermore, I used logical analysis methods, such as examining case studies and relevant examples, to illustrate the practical applications of AI at both national and international levels.

To gather data on customer perspectives, I adopted a quantitative method: the questionnaire, owing to its numerous advantages. These include efficiency in data collection, the ability to gain detailed insights into respondents' opinions, standardization of questions, ease of comparative analysis, precision in responses, clarity of results, and the presentation of findings in an easy-to-interpret format.

I designed the questionnaire using Google Forms and distributed it online to individuals interested in innovations within the financial sector. Simple random sampling was employed due to its practicality and the short time frame (5 days) required for data collection and processing. A total of 121 respondents participated in the questionnaire, of whom 108 passed the filter question. Consequently, only individuals who interact with financial institutions at least occasionally were included in the sample. This sample is representative, as the study aims to analyze customer preferences regarding AI implementation in financial institutions and draw relevant conclusions.

The questionnaire consists of four sections. The first section includes the filter question, which allows respondents who are not clients of financial institutions to exit the survey. The second section, comprising eight questions, collects key data on customers' preferences for AI technologies in finance. The third section contains four questions focused on the improvement of AI-based products and services in financial institutions and strategies to enhance customer trust. The final section includes five questions on socio-demographic characteristics, addressing respondents' age, gender, occupation, education level, and monthly income. All questions were set as mandatory to prevent missing data errors.

The collected data was analyzed and serves as the basis for the tables and figures presented in Chapter 3, which discusses the questionnaire results.

4. RESULTS

In this chapter, we will analyze information regarding clients' perspectives on the use of AI technologies within financial institutions and draw conclusions based on these data.

Upon analyzing the responses to the filter question, we found that 89.3% of the individuals who accessed the survey interact, at least occasionally, with financial institutions either online or in person and benefit from their services on a daily, weekly, or monthly basis. These individuals constitute the sample. Respondents who do not interact with financial institutions, representing 10.7% of the total, exited the survey, and their responses were deemed non-representative. This result highlights a high demand for financial institution services, suggesting that these institutions should focus on effectively meeting their clients' needs.

Table 1 refers to the socio-demographic characteristics of the respondents.

Table 1. Socio-demographic characteristics

Variables/Description	Resp.*	Variables/Description	Resp.*
Age		*The last completed level of education*	
18-20 years	24,1%	High school education	56,5%
21-25 years	60,2%	Higher education: Bachelor's	30,6%
26-30 years	5,6%	degree	10,2%
31-40 years	4,5%	Higher education: Master's degree	0%
>41 years	5,6%	Higher education: Doctoral studies	2,7%
		None of the above	
Gender		*Monthly income (RON)*	
Female	81,5%	<900	15,7%
Male	18,5%	900-2500	35,2%
Occupation		2501-3300	13,9%
Student	70,4%	>3300	19,5%
Employee	25,9%	Prefer not to answer	15,7%
Others	3,7%		

*Note: *Resp. – percentage of respondents*

Source: developed by author

According to the table above, 89.9% of the sample consists of individuals aged between 18 and 30 years, demonstrating a strong tendency among young people to adapt to and show interest in new technologies. Additionally, 97.3% of respondents have completed at least a high school education, indicating a relatively high level of education within the sample. This was expected, as understanding certain terms and concepts used in the questionnaire requires a certain degree of education.

It is also noteworthy that female respondents constitute a higher proportion of the sample than male respondents. Regarding income levels, the sample is characterized by relatively low earnings, with only 19.5% of respondents earning more than the minimum wage. This suggests that clients are likely to prefer financial services leveraging AI, as such technologies minimize costs and expenses through increased efficiency.

Finally, 25.9% of respondents are employees, while 70.4% are students. This distribution accounts for the relatively low income levels observed in the sample.

Tables 2 and 3 show the results obtained from evaluating the respondents' preference for using AI technologies in the financial sector.

Table 2. Customer preference regarding AI

Variables/Description	**Resp.***	**Variables/Description**	**Resp.***
Evaluate your overall previous experience with using applications that utilize AI technology within financial institutions::		*Evaluate how comfortable you feel when using financial services that utilize AI technology:*	
Very positive	6,5%	Very comfortable	12%
Positive	54,6%	Comfortable	60,2%
Neutral	37%	Neutral	21,3%
Negative	1,9%	Uncomfortable	5,6%
Very negative	0%	Very uncomfortable	0,9%
Do you believe AI can improve the overall customer experience within financial institutions?		*What level of trust do you have in AI systems used within financial institutions?*	
Yes, definitely	30,6%	Very high	10,2%
Yes, probably	50,9%	High	39,8%
I am not sure	14,8%	Moderate	44,4%
No, probably not	2,8%	Low	5,6%
No, definitely not	0,9%	Very low	0%
To what extent do you believe AI can improve the efficiency and accuracy of financial processes/services within institutions?		*To what extent do you believe AI can contribute to increasing transparency and security in financial transactions?*	
Very much	19,4%	Very much	24,1%
Much	42,6%	Much	49,1%
Moderately	35,2%	Moderately	20,4%
Little	2,8%	Little	5,5%
Not at all	0%	Not at all	0,9%

*Note: *Resp. – percentage of respondents*

Source: developed by author

Table 3. Customer preference for AI vs. human agents

Would you prefer to interact with a human agent or an AI interface for the following services?	**Human agent**	**AI interface**	**It depends on the situation**	**I'm not sure**
Assistance	22,2%	10,2%	64,8%	2,8%
Managing your own funds	44,4%	19,5%	29,6%	6,5%
Creating a savings plan	49%	29,7%	17,6%	3,7%
Contracting a loan	61,1%	18,5%	17,6%	2,8%
Making investments	52,8%	22,3%	20,3%	4,6%
Creating a pension plan	45,3%	24,1%	21,3%	9,3%
Contracting insurance	42,6%	36,1%	16,7%	4,6%
Transferring funds	34,2%	46,4%	14,8%	4,6%
Currency exchange	19,4%	59,3%	18,5%	2,8%

Source: developed by author

Following the analysis of the results, we found that a very small proportion of respondents had negative previous experiences (1.9%) or feel uncomfortable (6.5%) regarding the use of applications that employ AI technologies within financial institutions. This result demonstrates that new technologies are, for the most part, perceived as useful and efficient, and in practice, they do not present difficulties in delivering financial services. Furthermore, 81.5% of respondents believe that AI could enhance their overall experience with financial institutions. 62% think that AI can significantly or very significantly improve the efficiency and accuracy of financial processes and services within institutions, while 73.2% believe that AI can contribute greatly or very greatly to increasing transparency and security in financial transactions.

Based on the data analysis from Table 3, we reached the following conclusions: respondents are not ready to fully replace the services provided by human agents with those offered through AI technologies. Although the majority of respondents feel comfortable using AI-based financial services, many still have more trust in human agents when it comes to assistance (22.2% vs 10.2%), managing personal funds (44.4% vs 19.5%), creating savings plans (49% vs 29.7%), obtaining loans (61.1% vs 18.5%), making investments (52.8% vs 22.3%), setting up retirement plans (45.3% vs 24.1%), and obtaining insurance (42.6% vs 36.1%). However, AI is preferred for activities such as fund transfers (46.4% vs 34.2%) and currency exchange (59.3% vs 19.4%). These results indicate that the majority of respondents (44.4%) have moderate trust in AI systems used within financial institutions.

Next, we will analyze the factors that contribute to the reduced trust in AI systems and explore ways to improve services and increase the trust of financial institution clients. These data are presented in Table 4.

Table 4. Improving Services and Increasing Customer Trust

Variables/Description	Resp.	Variables/Description	Resp.
What do you think are the main benefits of using AI within financial institutions?		*Main customer concerns regarding the use of AI in the financial sector*	
Increased efficiency	69	Data privacy	60
Personalized services	49	Decision accuracy	62
Improved accessibility	55	Excessive dependence	40
Reduced human errors	58	on technology	35
		Lack of human interaction	
How could financial institutions build more trust in the use of AI technologies in their services?		*What measures do you think should be taken to ensure the responsible and ethical use of AI within financial institutions?*	
By providing more information on how the AI system works	69	Stricter regulations in the field	40 77
By offering additional guarantees regarding the security of personal data	64	Continuous monitoring of algorithms	56
By increasing transparency in the decision-making process of algorithms	36	Transparency in the decision-making process of algorithms	45
		Proper staff training	

Source: developed by author

After collecting the data, we identified the main concerns of customers, the most important being the fairness of decisions made by algorithms (62 responses), followed by data privacy (60 responses), excessive dependence on technology (40 responses), and lack of human interaction (35 responses). To overcome these barriers and increase trust in the use of AI technologies in financial services, these institutions should implement measures such as: providing more information on how the AI system works (69 responses), offering additional guarantees regarding the security of personal data (64 responses), increasing transparency in the decision-making process of algorithms (36 responses), stricter regulations in the field (40 responses), continuous monitoring of algorithms (77 responses), transparency in the algorithmic decision-making process (56 responses), and proper training of staff (45 responses). Thus, we conclude that if AI-based financial services manage to gain more trust from customers, their needs would be met more efficiently, significantly improving their experience.

5. BENEFITS AND RISKS ASSOCIATED WITH AI TECHNOLOGY IN THE FINANCIAL SECTOR

5.1. Benefits and Risks from the Perspective of Financial Institutions

(+) Key areas in the financial industry where AI adds significant value compared to traditional approaches are as follows:

1. Credit Assessment: Many financial institutions engage in lending activities. To accomplish this task, it is essential to assess individuals or companies accurately.

2. Algorithmic Trading: When the market reacts swiftly to various stimuli, a lack of timely action may lead to missed opportunities. For this reason, institutions invest heavily in complex systems capable of making quick decisions and autonomously executing trades.

3. Process Automation: AI technologies offer many advantages in terms of automation, significantly improving the efficiency of routine and time-consuming tasks. Examples include document digitization, form processing, and extracting relevant information from documents.

4. Increased Efficiency: AI technologies streamline financial processes by reducing transaction costs and time, ensuring quick and reliable processing of large data volumes. This reduction in service costs and advancements in databases enhance financial inclusion by expanding the range of services available to users.

5. Advanced Databases: The processing of massive data volumes helps to understand the institution's current state and make appropriate decisions, improving accessibility.

6. Fraud Prevention: AI in financial crime has become an area of interest for all professionals within financial institutions.[6] There are numerous machine learning algorithms specializing in recognizing fraudulent behavior, blocking potential attacks, and detecting suspicious transactions, thus enhancing security.

(-) AI technologies also present some potential risks to economic stability:

1. Data Distortion: Incorrect data fed into a trading algorithm can have serious consequences for the entire system, leading to unsuccessful transactions and financial losses.

2. Interconnected Networks: A single point of failure in a technology or infrastructure, such as a cyberattack, can cause cascading effects capable of destabilizing markets and disrupting access to financial services across multiple institutions, creating market panic.

3. Regulatory Challenges: Regulatory authorities must strike a balance between fostering innovation and mitigating associated risks. Strict regulations

[6] Gupta, A., Dwivedi, D. N., Shah, J., Artificial Intelligence Applications in Banking and Financial Services, Springer Nature Singapore, 2023, p.57

may stifle innovation, while lenient ones could increase the system's vulnerability to potential threats.

4. Cybersecurity Challenges[7]: These threats can lead to data errors, financial losses, and the erosion of trust in the system.

5. High Investment Costs: AI technology requires a substantial amount of financial resources and equipment. Many organizations cannot afford to develop their own AI-based systems and must resort to service providers.furnizorilor.

5.2. Benefits and Risks from the Perspective of Clients

(+) The benefits offered to clients through the implementation of AI within financial institutions include:

1. Robo-Advisors: These provide asset management services and portfolio recommendations based on investors' risk preferences, disposable income, and individual goals. The main advantages of these systems are ease of use, lower costs, and the lack of need for financial knowledge.

2. Personalized Banking Experience: The banking sector aims to leverage AI to offer personalized banking experiences for each individual. A relevant example is the implementation of chatbots.[8] Using advanced techniques, they can understand the client's intent and guide them in resolving issues.

3. Objectivity: AI-based assessment systems have the ability to make impartial and objective decisions, eliminating errors caused by human factors, such as a bank employee's mood on a given day or other factors that might influence the decision.

(-) Among the risks, we can list the following:

1. Biased Data: Algorithmic systems, if not controlled and updated, may lead to discriminatory practices, such as unfair loan denials.

2. Functional Errors: Discrepancies may arise between the products offered to clients by AI and their actual needs. Thus, some clients may refuse to use online banking services.

3. Resistance to Change: This is driven by limitations, risks, low understanding, and a lack of trust in AI technologies from clients.[9]

6. IMPLEMENTATION OF AI TECHNOLOGIES IN ROMANIA AND THE EU

In recent years, AI technologies have started to be increasingly used in finance, both in Romania and in other EU member states. According to the diagram in Fig. 1, 8% of enterprises in the EU used AI technologies in 2023,

[7] Gera, R., et al, Artificial Intelligence, Fintech, and Financial Inclusion, CRC Press, 2023, p.155
[8] Ng, J., Shah, S., Hands-On Artificial Intelligence for Banking, Packt Publishing, 2020, p.16
[9] National strategic framework on Artificial Intelligence 2023-2027

with Romania ranking last. Thus, in 2023, fewer than 1 in 10 companies in the EU utilized AI technologies.

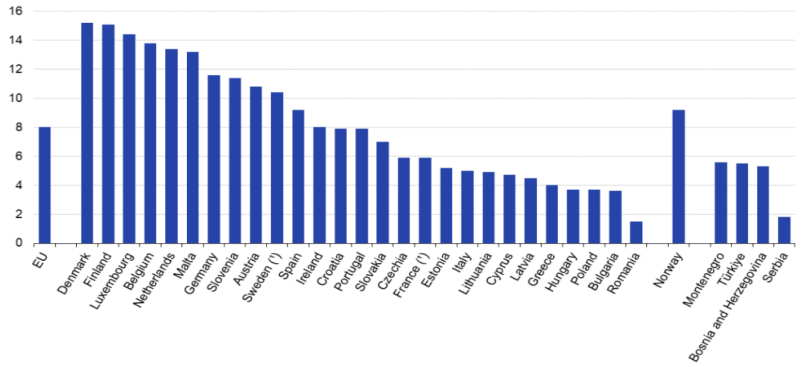

Figure 1. Enterprises in the EU using AI technologies, 2023 (% of enterprises)
Source: Eurostat (isoc_eb_ai)

When we consider how AI and machine learning are used in the financial and banking industries, customer service is likely the first area that comes to mind, along with both local and international examples. Chatbots like George, Ana (Raiffeisen), Livia (BT), and Ada (BCR) have positioned themselves as automated representatives for the customer service departments of the most well-known banks in Romania, facilitating interactions with millions of clients. However, customer service is merely the tip of the iceberg in terms of revolutionary technology use. There is a significantly broader range of benefits and applications, both for financial institutions and end consumers.[10]

Governments in Romania and the EU have encouraged the adoption of AI technologies in the financial sector through specific initiatives and regulations. On March 13, 2024, the European Parliament voted in favor of approving the Artificial Intelligence Act ("AI Act"), which regulates AI development to ensure it does not pose a risk to humanity.[11]

According to FINMA's 2023 annual report, most institutions using AI closely monitor developments in this field. Complete automation is rarely pursued, and the human factor is still considered highly important. Most institutions do not see the risks as fundamentally new and are already addressing them within their existing risk management processes.[12]

[10] https://futurebanking.ro/ia-si-machine-learning-in-industria-bancara-si-in-cea-financiara
[11] https://www.europarl.europa.eu/
[12] FINMA annual report 2023

Across the EU, there are numerous projects and collaborations between financial institutions and research organizations aimed at developing and implementing AI-based solutions. These initiatives focus on improving financial services, risk management, and regulatory compliance. For instance, on March 14, 2024, Banca Transilvania integrated Microsoft 365 Copilot and GitHub Copilot, AI-based assistants.[13] Through a partnership with Microsoft, Banca Transilvania also launched the AI Search function on the "Întreb BT" platform in October 2023, an online search engine with over 2,000 banking-related questions and answers.

According to the 2023-2024 investment report from the European Investment Bank, companies that use AI tend to perform better than those using other advanced digital technologies. These companies are, on average, larger, pay higher salaries to their employees, and are more productive.[14] In Fig. 2, the types of AI technologies used in the EU are represented according to company size. A positive correlation is observed between company size and AI technology usage. Larger companies appear more likely to adopt AI technologies, a trend likely attributable to the greater financial and human resources available for implementing and managing these technologies. The relatively low percentage of small and medium-sized companies using AI technologies indicates a need for policies and initiatives that encourage and support these companies in adopting new technologies.

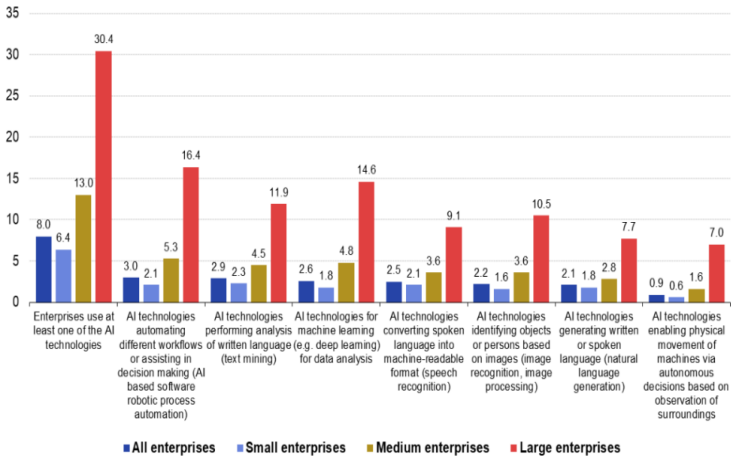

Figure 2. Enterprises in the EU using AI, by type of technology and size, 2023 (%)
Source: Eurostat (isoc_eb_ai)

[13] https://www.bancatransilvania.ro/news/comunicate-de-presa/BT-integreaza-microsoft-365-copilot-si-github-copilot-asistenti-ai
[14] EIB Investment Report 2023/2024

7. CONCLUSIONS

As a result of this detailed research, the goal of analyzing the necessity of AI in financial institutions and assessing client preferences for new technologies was successfully achieved. Thus, the initial hypothesis was confirmed, showing that AI increasingly dictates the performance of economic entities and offers a wider range of services, ensuring a more pleasant client experience.

From the perspective of financial institutions, we concluded that company performance improves with the implementation of intelligent technologies. By identifying and analyzing the benefits and risks associated with the use of AI in finance, we found that most risks can be mitigated and minimized through specific regulations or investments. Ongoing collaboration among policymakers, regulatory authorities, financial institutions, and technology companies is essential for maintaining a safe and stable financial ecosystem. In this ongoing debate over the benefits and risks of AI in financial institutions, the advantages prevail. These advantages relate to higher profit, efficiency, and market positioning for institutions that integrate new technologies into their activities. The adoption of AI in the financial sector is essential due to its long-term benefits for the economy, including a significant increase in company productivity and enhanced competitiveness. Thus, using AI in finance is both rational and reasonable.

From the perspective of financial institution clients, we conclude that AI can address various customer needs, enhancing their overall experience. By offering personalized services, rapid assistance, and fraud prevention, AI becomes an essential tool for increasing customer satisfaction and fostering long-term relationships. Although AI systems do not yet inspire the same level of trust as human agents, financial institutions could adopt various measures to boost customer trust and alleviate concerns. AI technologies could significantly contribute to company performance by streamlining activities and, thereby, reducing client costs.

As practical strategies for AI implementation, we suggest that financial institutions conduct surveys and questionnaires on this topic, aimed at understanding client needs, assessing acceptance levels of AI technologies, and gathering information on issues clients face when interacting with new technologies. Based on these results, financial institutions can make relevant decisions and adopt practical solutions to minimize risks and improve their products and services.

During this study, certain limitations arose, such as limited experience in conducting scientific communications, time constraints, and a small sample size, which may not provide as representative data as a larger sample would.

This research can serve as a foundation for new studies in the fields of finance and AI. Future research directions may include analyzing the impact of large-scale implementation of intelligent technologies on job opportunities or conducting more in-depth studies on the influence of AI on customer behavior.

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